

Work Order ID 59325

Tuesday, June 01, 2010 11:36:38 AM

Page 1

Item ID: D350-748-141TRN

Accept

Setup Start

Revision ID:

Stop

Item Name: Crosstube Turning Detail

Start Date: 6/1/2010 Start Qty: 1.00

Cust Item ID:

Required Date: 6/8/2010 Req'd Qty: 1.00

Customer:

Reference:

Run Start

Approvals:

Process Plan:

Date: 10-6-01

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D350-748-141	Rev E								
100	MORI SEIKI CNC LATHE LARGE	0.00							
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Fill tube with sand & install plugs on both ends as per Folio FA648 2-Turn first side as per Folio FA648 3- File transition lines smooth.								
110	QC1- Inspect dimensions to dimension sheet	0.00							
QC	Memo	0.00							
Quality Control									
120	MORI SEIKI CNC LATHE LARGE	0.00							
Mori Seiki	Memo	0.00							
Mori Seiki CNC Lathe Large	1-Turn second side as per Folio FA648 2- File transition lines smooth. 3-Scribe Part & Batch as per Dwg D350-748-141								

Q.M. 10-06-096

Q.M. 10-06-050

Q.M. 10-06-070

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130  QC Quality Control	QC1- Inspect dimensions to dimension sheet Memo	0.00 0.00				0.11	10	06-070	
140  QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00				(14)	10	MB 10-06-10	
150  Crosstubes Crosstubes	Large Fab Memo Grind machining marks	0.00 0.00				1	✓	AWM 10-06-10	

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
160 	Outsource process - Heat Treat	0.00							
Outsource1	Memo	0.00							
Outsource process - Heat Treat	Issue P/O: <u>12209</u> Heat Treat to min 180 KSI As per Dwg D350-748-141 (MIL-T-6736 OR AMS 2759-1C) Sand Blast tube after Heat Treat Possible Supplier: Vac Aero Ensure Certificate of Conformity is attached								
170 	Receive & Inspect for Damage & Mat'l Certs	0.00							
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformaty is attached								
180 	QC6- Inspect dimensions to drawing	0.00							
QC	Memo	0.00							
Quality Control									

CL 10/7/06 ①

PC 10/7/22 ①

PC 10/8/2 ①

CL

LPI PO 12352

B810-7-30 ①

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QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
190 Packaging	Packaging	0.00				(1K)			
Packaging	Memo Identify and stock in kanban rack Location: <i>Subeal</i>	0.00							
200 QC	QC21- Final Inspection - Work Order Release	0.00							10/08/09 <i>df</i>
Quality Control	Memo	0.00							mf 10-8-9

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Picklist Print

Tuesday, June 01, 2010 11:36:43 AM

Page 1

Work Order ID: 59325

Parent Item: D350-748-141TRN

Parent Item Name: Crosstube Turning Detail


Comments: IPP Rev:A New Issue 08-03-06 DD verified by:ec
 IPP Rev B Removed polish 08.04.02 EC verified by : DD
 IPP Rev C Remove LPS-3 08.06.23 EC verified by DD

Start Date: 6/1/2010

Required Date: 6/8/2010

Start Qty: 1.00

Required Qty: 1.00

Component Item ID/	Replacement	Mfg/	Bin	Primary	Last	Route	Unit of	Qty on	Qty per Kit	Total	Qty	Date	Status
D6017-115		Manufactured	No			110	Each	26.0000	1	1			
										<u>0.00 10-06-090</u>			
						<u>Location</u>		<u>Loc Qty</u>	<u>Loc Code</u>				
						LG		26					
						32912		26			<u>1</u>		

Crosstube Material

W/O:		WORK ORDER CHANGES						
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DART AEROSPACE LTD		Work Order: 59321
Description: Crosstube Assembly (AS350/355 High Fwd)		Part Number: D350-748-141
Inspection Dwg: D350-748-141 Rev: D		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	2.240	+0.005/-0.000	2.244	/		
	2.180	+0.005/-0.000	2.185	/		
	2.180	+0.005/-0.000	2.185	/		
	2.237	+0.005/-0.000	2.242	/		
	2.272	+0.005/-0.000	2.272	/		
	2.306	+0.005/-0.000	2.311	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.339	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
SIDE B	2.240	+0.005/-0.000	2.243	/		
	2.180	+0.005/-0.000	2.185	/		
	2.180	+0.005/-0.000	2.185	/		
	2.237	+0.005/-0.000	2.242	/		
	2.272	+0.005/-0.000	2.272	/		
	2.306	+0.005/-0.000	2.311	/		
	2.339	+0.005/-0.000	2.339	/		
	2.339	+0.005/-0.000	2.339	/		
	0.062	+/-0.010	0.062	/		
	4.26	+/-0.030	4.260	/		
	R0.063	+/-0.010	R0.063	/		
	R0.50	+/-0.030	R0.500	/		
	110.27	+/-0.060	110.270	/		

Measured by: CM	Audited by: MB	Prototype Approval: N/A
Date: 10.06.07	Date: 10-06-10	Date: N/A

Rev	Date	Change	Revised by	Approved
A	06.11.09	New Issue (P/O D350-748-101)	KJ/JLM	
B	07.10.24	Dwg Rev updated	KJ/EC/DD	

W/O:			WORK ORDER CHANGES					
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Item	Qty -141	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6017-115	CROSSTUBE
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 59325

BS-0-6-1

RELEASED
2009-10-29

E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C6-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>RF</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D350-748-141 TITLE CROSSTUBE (AS 350/355 HI FWD) DATE 09.09.30	
DRAWN	RF		
CHECKED	<i>RF</i>		
MFG. APPR.	<i>RF</i>		
DE APPR.	<i>RF</i>		
REV. E	SHEET 1 OF 4	SCALE	NTS
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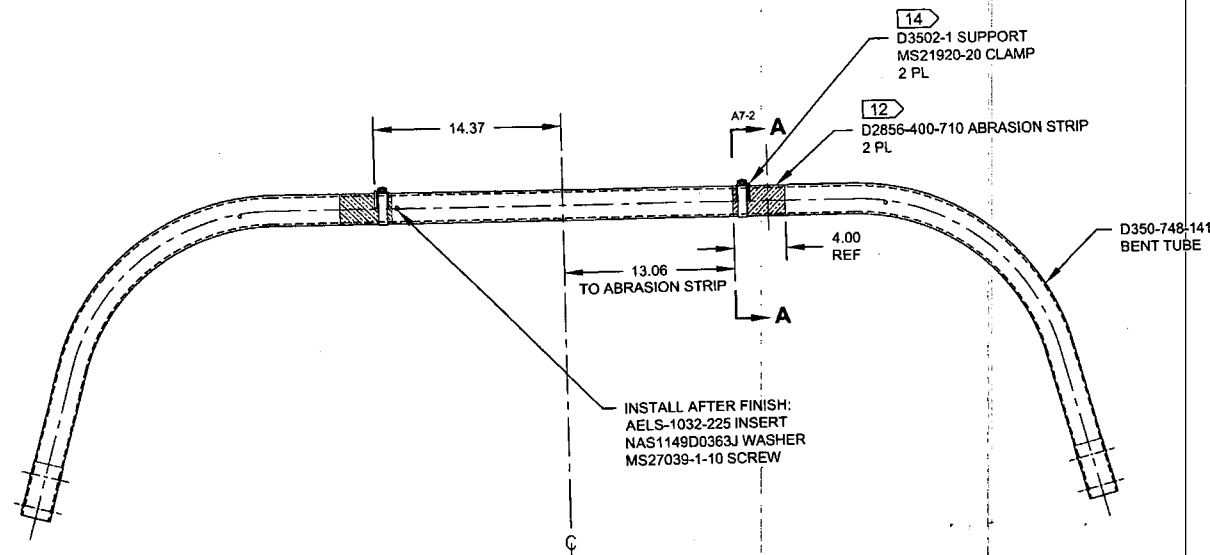
W/O:		WORK ORDER CHANGES					
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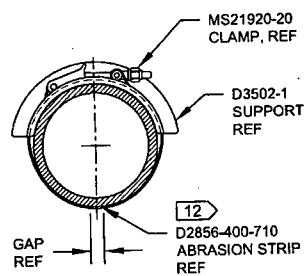
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**D350-748-141
ASSEMBLY DETAIL**



SECTION A-A D4-2
SCALE 4X

u/o 59325

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO.	REV. E
CHECKED	RF	D350-748-141	SHEET 2 OF 4
MFG. APPR.	RF	TITLE	SCALE
APPROVED	RF	CROSSTUBE (AS 350/355 HI FWD)	NTS
DE APPR.	RF	COPYRIGHT © 2008 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	
DATE	09.09.30		

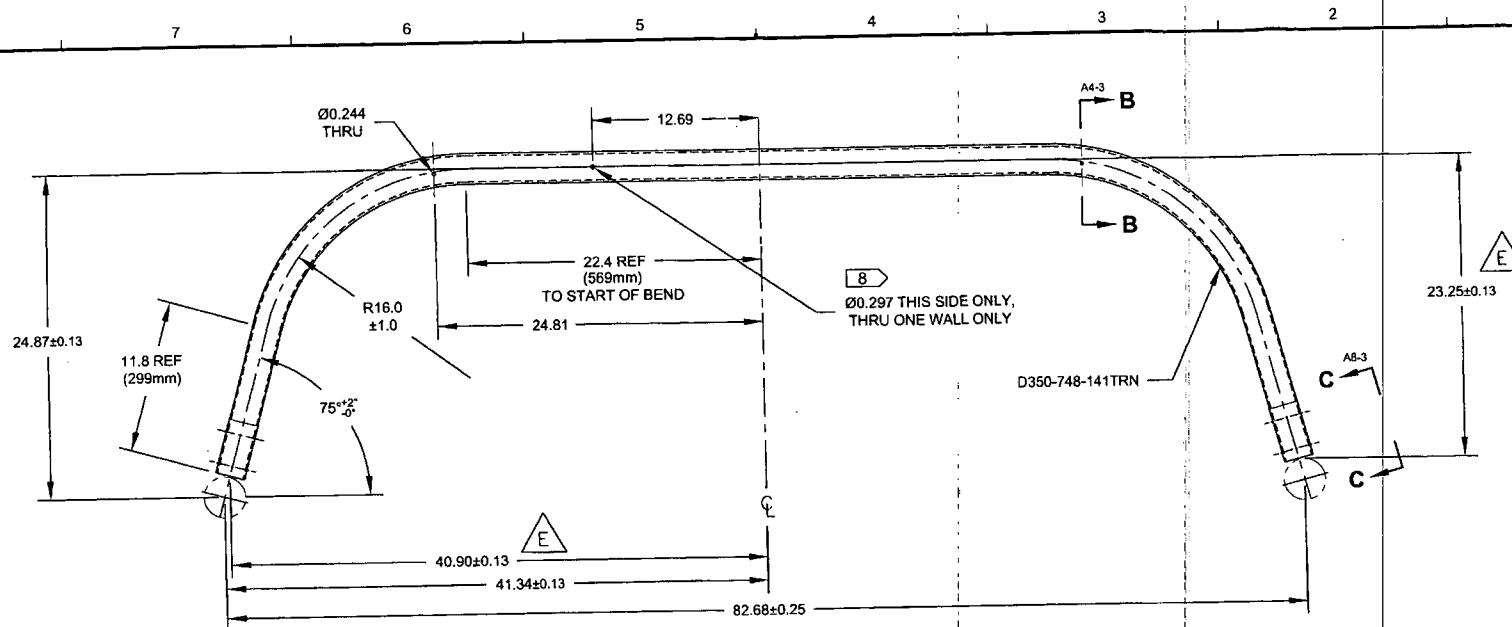
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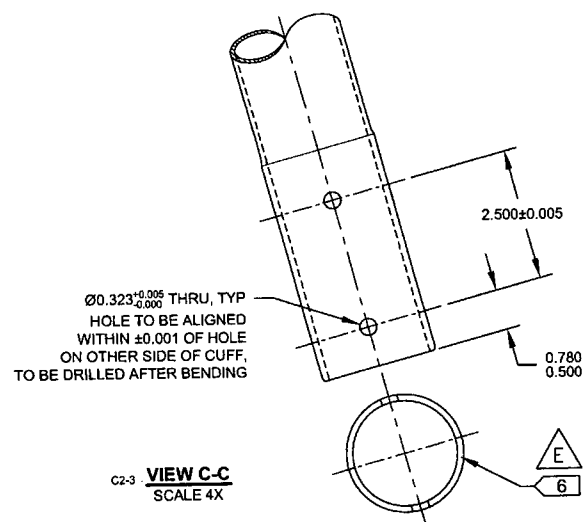
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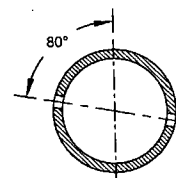
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D350-748-141
BENDING AND DRILLING DETAIL 10



C2-3 **VIEW C-C**
SCALE 4X



SECTION B-B D3-3
SCALE 4X

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. E
MFG. APPR.	RF	D350-748-141	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSS TUBE (AS 350/355 HI FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2005 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

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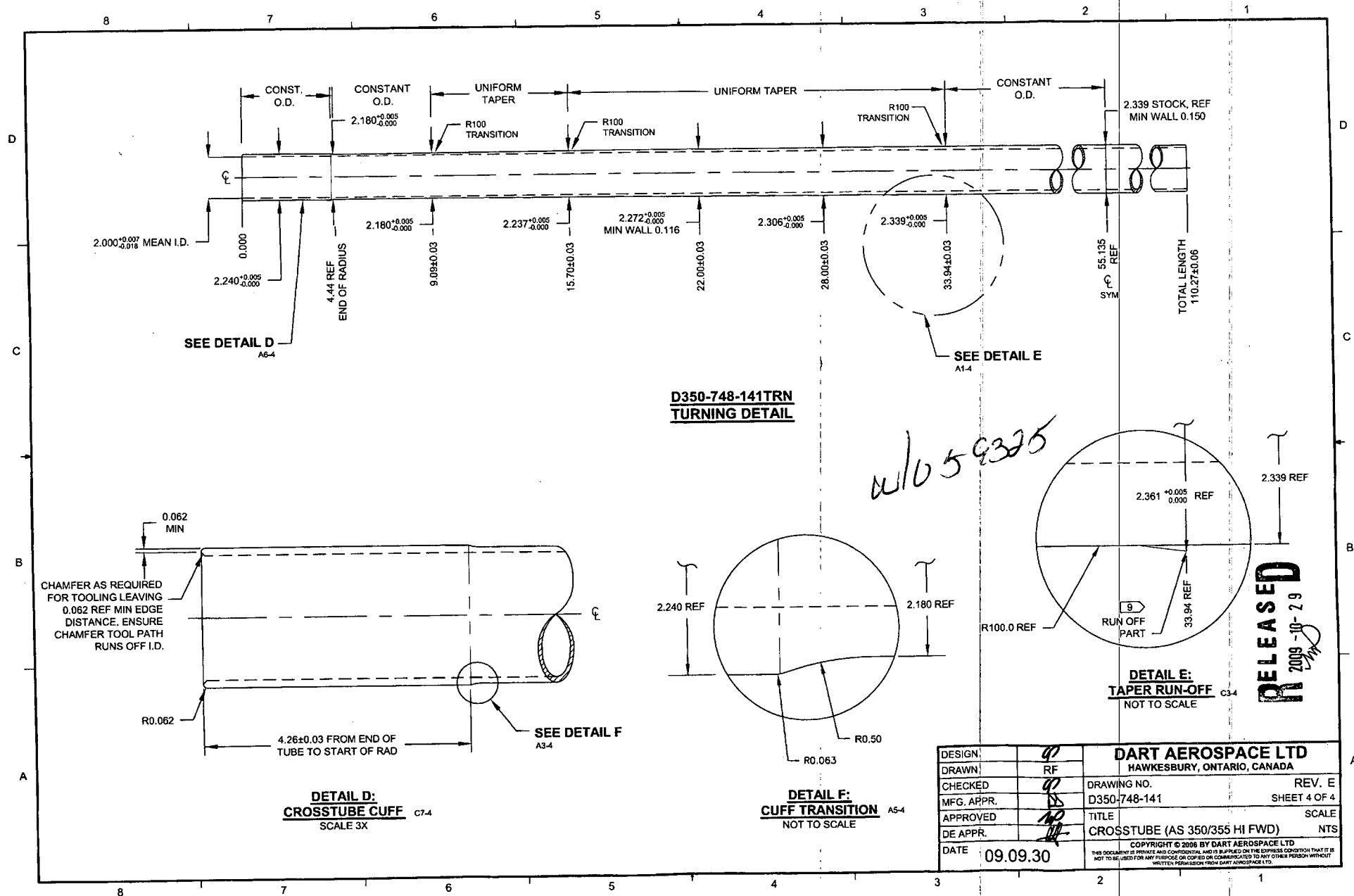
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VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No. : R105468102

OAK 121151-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

07/16/2010

MM / DD / YYYY

PAGE : 1

1DAR01

ILL TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

DATE SHIPPED	SHIP VIA	F.O.B.
07/16/2010		ORIGIN
CUSTOMER P/O No.	JOB No.	TERMS
PO12209		NET 30 DAYS

PART No.	DESCRIPTION	UOM	QTY ORD	QTY SHPD	TEST RESULTS
----------	-------------	-----	------------	-------------	--------------

D350-748 CROSS TUBE EA 16 16

Process Specifications: Procedure: 4353

HEAT TREATED TO 180 KSI MIN PER AMS 2759-1E

100% HARDNESS TESTED AS PER ASTM E-18, 40-45 HRC

MATERIAL: 4130

SAND BLASTED AFTER HEAT TREAT

10/07/23

P/N: D350-748-141: 59325, 59326, 59327, 59328, 59329, 59330, 59331, 59332

P/N: D350-748-241: 59586, 59588, 59589, 59549, 59587, 59550, 59551, 59552

100% HARDNESS TESTED

16 per

42/43 HRC



hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant hereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.



METAL TREATING INSTITUTE

Flaura Robinson
Authorized Q.C. Inspector



Accredited
Nadcap
Heat Treating • Welding

VACUUM BRAZING - HEAT TREATING - SPECIAL PROCESSING - FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL - PLASMA AND OTHER COATINGS



LIQUID PENETRANT TEST REPORT

P- 15186

CLIENT DART Aerospace DATE July 30-2010 PAGE 1 OF 1
ATTENTION LINDA/CHATEL ACUREN JOB NO. 188-10-0814
ADDRESS 1270 ALBERT DEEN, Hawkesbury POWO No. 12209 - LPI 123521
ONTARIO WORK LOCATION 188-10-0814
K&H LK7 ACCEPTANCE STD. ASTM 1417 REV./DATE 2007
PROJECT F.P.I. ON CROSS TUBES
ITEM(S) EXAMINED 4 PCS

JOB DESCRIPTION		PROCEDURE No. <u>LT-0007</u> REV./DATE	TECHNIQUE No. <u>LT-0002</u> REV./DATE
PART NO.	MATERIAL <u>STEEL</u>		THICKNESS
SCOPE <u>WET FLUORESCENT LIQUID PENETRANT</u> <u>INSPECTION CARRIED OUT 100% EXTERNAL</u>			
TEST DETAILS			
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH
FAMILY BRAND	<u>MAGNAFLUX</u>		<input type="checkbox"/> SOLVENT REMOVABLE
PENETRANT	<u>2LG7</u>	MINIMUM DWELL TIME <u>45</u> MIN.	<input type="checkbox"/> POST EMULSIFIED
PENETRANT REMOVER	<u>H20</u>	MINIMUM DRY TIME <u>>10</u> MIN.	BLACK LIGHT S/N <u>16459</u> <input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
DEVELOPER	<u>SK9 52</u>	MINIMUM DWELL TIME <u>10</u> MIN.	<input type="checkbox"/> AMBIENT < 2 fc
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY
LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT		<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
OTHER <u>LABINO</u>		LIGHT METER S/N <u>1098866</u> CAL DUE DATE <u>06-19</u>	
		<u>2010</u>	

TEST SURFACE			
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED
SURFACE TEMPERATURE	<input type="checkbox"/> < - 4°C/ 20°F	<input type="checkbox"/> - 4°C/ 20°F TO 10°C/50°F	<input type="checkbox"/> 10°C/50°F TO 52°C/125°F
	<input type="checkbox"/> > 52°C/125°F	<input checked="" type="checkbox"/> CLEAN BARE METAL	

RESULTS- (<input type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL)	
<u>1 CROSS TUBE W.O. 59586</u> <u>ITEM I.D. D350-748-241TRN</u> ✓	<u>PROCESS TO NDT INSPECTION.</u> <u>TURN ON LATHE</u> <u>Q.C. INSPECTION DIMENSIONS</u> <u>GRIND MARKING MARKS</u> <u>Q.C. INSPECTION VISUAL.</u> <u>OUTSOURCE : HEAT TREAT</u> <u>: SAND BLAST.</u> <u>Q.C. RECEIVING INSPECTION.</u> <u>D.L.P.I. (FLUORESCENT LEVEL II</u> <u>INSPECTOR.) COMPLETED 7/30/2010</u> <u>10-08-03</u>
<u>1 CROSS TUBE W.O. 59559</u> <u>ITEM I.D. D350-748-241TRN</u> ✓	
<u>1 CROSS TUBE W.O. 59330</u> <u>ITEM I.D. D350-748-141TRN</u> ✓	
<u>1 CROSS TUBE W.O. 59375</u> <u>ITEM I.D. D350-748-141TRN</u> ✓	

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES	
CLIENT REPRESENTATIVE <u>Chavella</u>	DTR # <u>E63374</u>
TECHNICIAN (SIGNATURE) <u>Mike Johnston</u>	REPORT REVIEWED BY:
NAME (PRINT): <u>Mike Johnston</u>	NAME INITIALS
1 ST TECHNICIAN	2 ND TECHNICIAN
CGSB LEVEL <u>II</u> SNT LEVEL	CGSB LEVEL SNT LEVEL
CGSB REG. No <u>6606</u>	CGSB REG. No